

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A substrate assembly, comprising:

a support surface having a uniform composition and extending into a recess formed in the substrate;

a conductive layer spaced apart from the support surface and extending into the recess;
and

a plurality of high-K dielectric layers positioned between the support surface and the conductive layer, including a first high K dielectric layer, and a second high K dielectric layer including deposited components different from those in the first high K dielectric layer, wherein a common metal is present in at least two adjacent layers of said plurality, and wherein at least two layers of said plurality exhibit different degrees of oxidation so that at least one layer of the plurality of high-K dielectric layers manifests greater oxidation than would an equivalent thickness of an underlying layer of the plurality, further wherein the support surface remains substantially free of an oxide present in the plurality of high-K dielectric layers.

2. (Original) The substrate assembly in claim 1, wherein said plurality of high-K dielectric layers comprises a first high-K dielectric layer contacting said support surface.

3. (Original) The substrate assembly in claim 1, further comprising a barrier layer between said support surface and said plurality of high-K dielectric layers.

4. (Original) The substrate assembly in claim 1, wherein said support surface is a capacitor electrode.

5. (Previously Presented) The substrate assembly in claim 1, wherein said plurality of high-K dielectric layers defines a thickness of at most 200 angstroms.

6. (Original) The substrate assembly in claim 5, wherein said plurality of high-K dielectric layers comprises a first high-K dielectric layer contacting said support surface and defining a thickness of at least a monolayer.

7. (Previously Presented) The substrate assembly in claim 6, wherein said first high-K dielectric layer defines a thickness of at least 10 angstroms.

8. (Currently Amended) A capacitor dielectric, comprising:

a first high-K capacitor dielectric comprising ~~a metallic element~~ tantalum pentoxide;

a second high-K capacitor dielectric comprising ~~said metallic element~~ tantalum pentoxide, ~~having a lower oxygen density than said first high-K capacitor dielectric, and~~
contacting said first high-K capacitor dielectric, ~~wherein the first high-K capacitor dielectric~~
~~manifests a greater oxidation than would an equivalent thickness of the second high-K capacitor~~
~~dielectric, further wherein an oxide present in the first high-K dielectric layer and the second~~
~~high-K dielectric layer is not diffused into a support surface having a uniform composition that~~
~~extends into a recess that supports the first high-K dielectric layer and the second high-K~~
~~dielectric layer, and~~

a conductive layer spaced apart from the support surface and extending into the recess,
wherein the first high-K capacitor dielectric and the second high-K capacitor dielectric abut the
support surface and the conductive layer.

9. (Original) The capacitor dielectric in claim 8, wherein said first high-K capacitor dielectric defines a first thickness; and wherein said second high-K capacitor dielectric defines a second thickness that is different from said first thickness.

10. (Cancelled)

11. (Original) The capacitor dielectric in claim 10, wherein said first high-K capacitor dielectric is a first oxide; and wherein said second high-K capacitor dielectric is a second oxide different from said first oxide.

12. (Currently Amended) A capacitor dielectric, comprising:

a first high-K capacitor dielectric comprising tantalum pentoxide ~~a metallic element~~;

a second high-K capacitor dielectric comprising a high-K dielectric having at least one different component that the first high-K capacitor dielectric ~~said metallic element~~ and contacting said first high-K capacitor dielectric,

wherein said first high-K capacitor dielectric and said second high-K capacitor dielectric are oxides, ~~wherein said first high-K capacitor dielectric contains a first amount of oxygen per unit volume, and wherein said second high-K capacitor dielectric contains a second amount of oxygen per unit volume different from said first amount, further wherein the first high-K capacitor dielectric manifests a greater oxidation than would an equivalent thickness of the second high-K capacitor dielectric;~~ ;

a support surface having a uniform composition and extending into a recess that supports the first high-K dielectric layer and the second high-K dielectric layer that remains substantially free of the oxides; and

a conductive layer spaced apart from the support surface and extending into the recess, wherein the first high-K capacitor dielectric and the second high-K capacitor dielectric abut the support surface and the conductive layer.

13. (Currently Amended) A capacitor structure, comprising:

a first electrode layer having a uniform composition and extending into a recess in a substrate;

a dielectric layer disposed over said first electrode layer, wherein said dielectric layer comprises a plurality of consecutively-positioned sub-layers, wherein each of said sub-layers comprises a high-dielectric-constant material, ~~wherein said dielectric layer comprises an element common to all sub-layers of said plurality~~ wherein at least one of the sub-layers includes a deposited dielectric component different from one or more of the other sub-layers, and wherein

one of said sub-layers is more oxidized than another of said sub-layers so that at least one of the sub-layers of the dielectric layer manifests greater oxidation than would an equivalent thickness of an underlying sub-layer of the dielectric layer, further wherein the first electrode layer remains substantially free of an oxide present in the sub-layers; and

a second electrode layer disposed over said dielectric layer and extending into the recess.

14.-51. (Canceled)

52. (Currently Amended) A capacitor dielectric, comprising a plurality of capacitor dielectric layers defining a total thickness ranging from 50 to 70 angstroms, wherein each layer of said plurality is a tantalum pentoxide high-K dielectric defining an individual thickness ranging from 10 to 40 angstroms in thickness, ~~wherein at least one layer of said plurality manifests greater oxidation than would an equal thickness of an underlying layer of said plurality, and wherein each layer of said plurality comprises a metal oxide included within an adjacent layer of said plurality;~~ further wherein a supporting surface having a uniform composition and extending into a recess and abutting the plurality of capacitor dielectric layers remains substantially free of the metal oxide, and an electrode layer is disposed over the plurality of dielectric layers, the electrode extending into the recess.

53. (Original) The capacitor dielectric of claim 52, wherein at least a lowest layer of said plurality defines an individual thickness of about 20 angstroms.

54-61. (Cancelled)

62. (Currently Amended) A capacitor dielectric, comprising a plurality of capacitor dielectric layers positioned between a supporting surface having a uniform composition and extending into a recess and an electrode layer extending into the recess, the dielectric layers defining a total thickness ranging from 50 to 70 angstroms, wherein each layer of said plurality is a high-K dielectric defining an individual thickness ranging from 10 to 40 angstroms in thickness, wherein at least one layer of said plurality manifests greater oxidation than would an equal thickness of

~~an underlying layer of said plurality, wherein each layer of said plurality comprises a metal oxide included within an adjacent layer of said plurality, at least one layer in the plurality includes a component not present in other layers of the plurality, and wherein the underlying layer includes a means to minimize oxidation beyond the plurality of capacitor dielectric layers and into the supporting surface that extends into the recess, further wherein the metal oxide remains substantially within the plurality of capacitor dielectric layers.~~

63. (Currently Amended) A capacitor dielectric, comprising a plurality of capacitor dielectric layers disposed between a supporting surface having a uniform composition and extending into a recess and an electrode layer extending into the recess, wherein each layer of the plurality is a high-K dielectric, further wherein at least one layer of the plurality manifests a greater oxidation than would be present in an equal thickness of an underlying layer of the plurality, and wherein ~~each layer of the plurality comprises a metal oxide included within an adjacent layer of the plurality~~ at least one layer in the plurality includes a component not present in other layers of the plurality, further wherein the metal oxide remains substantially within the plurality of capacitor dielectric layers.

64. (Previously Presented) The capacitor dielectric of claim 63, wherein the plurality of capacitor dielectric layers defines a total thickness that ranges between approximately 50 angstroms and approximately 70 angstroms.

65. (Previously Presented) The capacitor dielectric of claim 63, wherein each layer of the plurality defines an individual layer thickness that ranges between approximately 10 angstroms and approximately 40 angstroms.

66. (Previously Presented) The capacitor dielectric of claim 63, wherein at least a lowest layer of the plurality defines an individual thickness of approximately 20 angstroms.

67. (Currently Amended) A capacitor dielectric, comprising a plurality of capacitor dielectric layers abutting a supporting surface having a uniform composition and extending into a recess

and an electrode layer extending into the recess, wherein each layer of the plurality is a high-K dielectric, further wherein at least one layer of the plurality manifests a greater oxidation than would an equal thickness of an underlying layer of the plurality, wherein each layer of the plurality comprises a ~~metal-oxide~~ tantalum pentoxide included within an adjacent layer of the plurality, and wherein the underlying layer includes a means to minimize oxidation beyond the plurality of capacitor dielectric layers, further wherein the ~~metal-oxide~~ tantalum pentoxide is not diffused from the plurality of high-K dielectric layers into the supporting surface extending into the recess and adjacent the plurality of layers.

68. (Previously Presented) The capacitor dielectric of claim 67, wherein the plurality of capacitor dielectric layers defines a total thickness that ranges between approximately 50 angstroms and approximately 70 angstroms.

69. (Previously Presented) The capacitor dielectric of claim 67, wherein each layer of the plurality defines an individual layer thickness that ranges between approximately 10 angstroms and approximately 40 angstroms.

70. (Previously Presented) The capacitor dielectric of claim 67, wherein at least a lowest layer of the plurality defines an individual thickness of approximately 20 angstroms.